

## Abstract

### Fuel Cell Voltage Control

An auxiliary load (148) for a fuel cell stack (102) is alternatively connected and disconnected from the fuel cell external circuit (177, 178) by a switch (200) in response to a switch control (201), repetitively, during startup and shutdown. The switch may be  
5 an insulated gate bipolar transistor (208) which is turned on and off by hunting between an upper limit voltage (207) and a lower limit voltage (208), which may be performed by compare circuits (205, 206), by the controller (202), or by commercially available voltage responsive hysteresis switches. Schedules of duty cycle as a  
10 function of cell stack voltage for startup (212) and shutdown (213) control a pulse width modulator (215) which operates the switch. Controls (229, 231) may limit the modulation so that the auxiliary load does not overheat, in response to temperature (221) of the load or a voltage/power model (235). The auxiliary load may comprise a  
15 heater in a water accumulator (247), an air intake (257) or an enthalpy recovery device (262).